PATENT SPECIFICATION

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(54) IMPROVEMENTS IN TELEVISION RECEIVERS

(71) We, THORN ELECTRICAL INDUSTRIES LIMITED, a British company of, Thorn House, Upper Saint Martin's Lane, London, WC2H 9ED, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to so-called intercarrier sound television receivers. In such receivers, instead of the sound signal being separated from the vision signal relatively early in the receiver, the two signals are amplified in common IF stages and are detected together. This produces a frequency-modulated sound signal with a carrier the frequency of which is equal to the difference between the frequencies of the vision and sound carriers.

Optimum performance would be given by the use of separate IF amplifiers for the vision and sound signals, but this is not usual because of the extra expense.

A block circuit diagram of a typical intercarrier sound receiver is shown in Figure 2 of the accompanying drawings. The aerial 10 is connected through a tuner and mixer circuit 12 to a selectivity and sound trap circuit 14. The output of circuit 14 is applied to the IF amplifier 16 and the output of amplifier 16 is detected in a detector 18. The output of the detector 18 consists of a video signal which includes the chrominance sidebands and which is applied to a video amplifier (not shown), and the intercarrier sound signal which is applied to an intercarrier IF and detector stage 20. The output of the detector is then applied through the sound output circuits 22 to the loudspeaker 24.

The output of the vision detector 18 is also used in an automatic gain control loop and for this purpose is applied through an AGC amplifier 26 to the vision IF amplifier 16. The circuit of Figure 2 is well-known and it is not believed that further description thereof is necessary.

The IF amplifier 16 and the selection circuitry 14 must provide sufficient sound rejection to avoid unwanted beat signals between the sound carrier and the video sideband signals, while leaving sufficient sound to enable a high intercarrier signal to be achieved after detection. Even with the latest integrated circuit synchronous detectors, sound rejections of up to 20 dB relative to the vision carrier are still required, so that the IF frequency response is typically of the form shown in Figure 1 of the accompanying drawings. The frequencies given are those applicable to a conventional British receiver for use with 625-line UHF transmissions, for which the vision carrier is 39.5 MHz, and the sound carrier is 6 MHz below this at 33.5 MHz. The dip in the frequency response at the sound carrier frequency is caused by the sound trap circuit in the circuit 14.

An intercarrier sound receiver of the type described operates well with normal signal conditions. However, under weak signal conditions the sound becomes noisy. We have appreciated that under weak signal conditions it is more important for the sound to be of good quality, than for the interference between the sound signal and the vision sidebands to be reduced. In other words the sound signal should be maintained as free of noise as possible, even if this means slightly further deterioration of the picture.

According to this invention there is provided an intercarrier sound television receiver of the type having common input stages for receiving and processing the received combined sound and vision signals, and separate sound and vision processing stages connected to the output of the said input stages, the receiver being provided with means responsive to the amplitude of

standing bias voltage across capacitor C3 and resistor R3 the diode D1 will become conductive. The effect of diode D1 going into forward conduction is to damp the tuned circuit and thus reduce the emitter degeneration at the sound carrier frequency. The gain of the stage at the sound carrier frequency is thereby increased.

Capacitors C1, C3 and C4 all have small impedances at the IF frequencies. Resistor R5 limits the diode current, and resistors R1, R2 and R3 are chosen so that the voltage across capacitor C3 is set for the desired turning-on point of diode D1. Resistor R4 acts on all the IF frequencies to set the overall gain of the stage.

There will also be some detuning effect due to the capacitance variation of the diodes between reverse conduction and forward conduction. However, in practical terms this effect is small and makes no significant difference to the tuning of the sound trap, so that it is the damping due to the forward resistance of the diode which produces the desired effect.

WHAT WE CLAIM IS:—

1. An intercarrier sound television receiver of the type having common input stages for receiving and processing the received combined sound and vision signals, and separate sound and vision processing stages connected to the output of the said input stages, the receiver being provided with means responsive to the amplitude of a signal in the common input stages to increase the amplification of the sound signal relative to that of the vision signal under weak received signal conditions as compared with its amplification under normal received signal conditions.

2. A receiver according to claim 1, wherein the said means is responsive to the level of an AGC signal.

3. A receiver according to claim 1 or 2, wherein the said means is operative under weak signal conditions to reduce the effectiveness of a sound trap circuit in the input stages.

4. A receiver according to claim 3, wherein the said means is operative at least primarily to de-tune the sound trap circuit.

5. A receiver according to claim 3, wherein the said means is operative at least primarily to damp the sound trap circuit.

6. An intercarrier sound television receiver constructed substantially as herein described with reference to Figures 3 and 4 of the accompanying drawings.

7. An intercarrier sound television receiver constructed substantially as herein described with reference to Figure 6 of the accompanying drawings.

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FIG. 3.

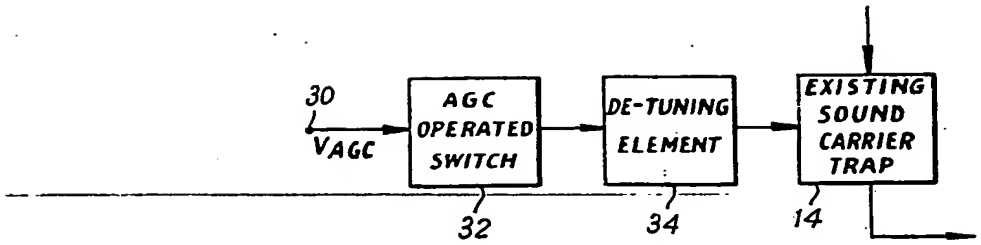
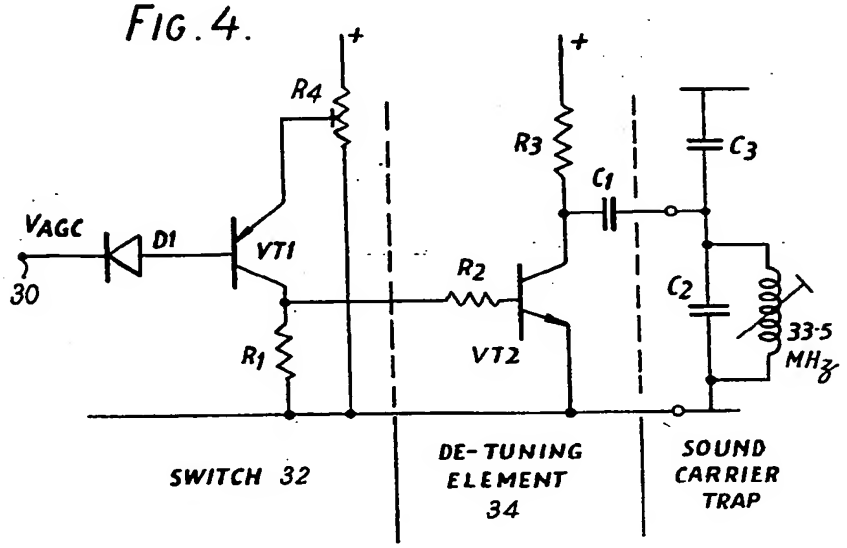

30
VAGC
AGC OPERATED SWITCH
DE-TUNING ELEMENT
EXISTING SOUND CARRIER TRAP
32
34
14

FIG. 4.


+
R4
R3
C3
C1
VAGC
30
D1
VT1
R2
C2
33·5 MHz
R1
VT2
SWITCH 32
DE-TUNING ELEMENT 34
SOUND CARRIER TRAP